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Principal Examiner Feedback

June 2011

International GCSE
Biology (4BI0) Paper 1B
Science Double Award (4SC0) Paper 1B

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International GCSE 4BI0 & Double Award 4SC0 Paper 1B – Summer 2011

General

The new specification for International GCSE Biology and Double Award Science was examined for the first time in Summer 2011. We are very pleased to welcome new centres and to welcome back centres who have taught 4325/4437 International GCSE and 7040 O level.

Once again this year the examiners were very impressed by the knowledge and understanding shown by the candidates on the paper. Candidates were also able to demonstrate application of knowledge and understanding, analysis and evaluation and investigative skills. Many centres have worked hard to carefully prepare candidates for the examination and this was evident in the biological knowledge and understanding and evaluative and analytical skills shown.

The paper gave a balance of question types and topics and the proportion of marks for each Assessment Objective matched those published in the specification.

Question 1 provided a diagram of a section through a leaf. In part a) almost all candidates could correctly name the structures labelled. Most were able to give the function of the waxy cuticle as reducing transpiration and preventing entry of microorganisms. Most could also give the word equation for photosynthesis, although a significant minority chose to give chemical formulae. In the final part the better candidates gained full credit for explaining that oxygen exits the stomata down a diffusion gradient from a high concentration to a lower one outside the leaf. Part b) asked candidates to suggest reasons why some plants lose their leaves in cooler months. Answers that gained credit included reduction of water loss, lack of sunlight for photosynthesis and conservation of energy resources.

Question 2 showed a diagram of a lily flower. In part a) almost all candidates could label the stigma and the anther. In part b) many candidates earned two marks for correctly describing insect-pollination as the transfer of pollen by an insect from the anther to the stigma. In part c) most could give two structural differences between the flower shown and a wind-pollinated flower. Some failed to earn marks by giving other differences such as scent, nectar or amount of pollen produced. In part c) the best candidates were able to describe the events from pollination to seed formation. This seemed to vary between centres. Some candidates had no knowledge of the growth of the pollen tube and how fertilisation occurs in flowering plants. Others confused germination of the pollen grain with germination of a seed.

Question 3 gave candidates a passage on delivery of antibiotics into a patient's circulation system. Almost all candidates gained 6 out of the 7 marks available. The most common error was when candidates named viruses as being killed by the antibiotic.

Question 4 presented a food chain and in part a) candidates had to use the information to complete a diagram, almost all gained full marks. Although most candidates could name one type of decomposer some suggested rose or another organism from the food chain. Part b) was correctly answered by most candidates. Candidates had no difficulty with parts c) and d).

Question 5 presented data on the protein, fat and mineral content of 5 different meats. In part a) almost every candidate could correctly identify the meat with least protein and calculate how many grams would be present in one kilogram of rabbit meat.

Question 6 was on inheritance of a dominant allele causing familial hypercholesterolaemia. In part a) the best candidates were able to write what is meant by the term recessive. The weaker candidates just stated that it was not dominant or was dominated by the dominant allele. Most candidates could however give the two genotypes that were at risk of FH. In part b) almost all candidates could fill in a simple genetic diagram to show the genotypes of the parents and the children. Most were also able to give the probability of producing a child with FH and the phenotype ratio of the children. Some candidates did not understand what probability is and others confused genotype with phenotype. Part c) required candidates to suggest how high levels of cholesterol might affect the ability of the heart to function. Many candidates earned full marks for their answers.

Question 7 described an investigation and presented data from a simple experiment to show how the sensitivity of the skin differs on the finger tips, back of hand and wrist. A similar experiment is described in the teachers' guide and in many textbooks. In part a) candidates had to compute the percentage correct from the raw data and almost all did this correctly. They then had to plot a bar graph in part b) to show the results of the investigation. Most did this very well and gained full marks. Some chose to combine data for the different distances and others chose to plot a line graph. In part c) most could use the data to identify that the finger tips are the most sensitive and then go on in part d) to suggest why. Many candidates suggested that on the finger tips one would find more receptors or that the nerve endings are closer together. In part e) most could suggest that if one varied the pressure then the experiment would not be a fair test and the better candidates explained why this would be the case.

Question 8 described an experiment to see if nitrate ions help a plant to grow. In part a) the best candidates were able to suggest that oxygen needs to be provided for respiration and to allow the roots to absorb ions by active transport. The better candidates were also able to recognise that keeping the apparatus covered in black paper would exclude light to prevent photosynthesis by algae in the ion solution. Other candidates gained some credit for reference to excluding light or preventing photosynthesis. In part b) candidates needed to measure the length of the two plants. Most were able to do this and the examining team allowed a range of values for each length. The candidates who did not earn the marks were either way out with their measurements or wrote 8.5mm. Almost all candidates could suggest that repeating the experiment would improve the reliability of the investigation and most could identify two factors that should be kept the

same. In part c) many candidates gained full marks for explaining how soluble nitrates could dissolve in rain and leach into the river leading to an algal bloom (eutrophication). This growth would block sunlight reduce photosynthesis and reduce oxygen levels leading to death of aquatic animals and plants. Some candidates also went on to describe the role of decomposers, but this was not necessary to earn full credit.

Question 9 was on cactus plants and their adaptations to survive in dry conditions. In part a) most candidates were able to explain how the absence of leaves would reduce evaporation and the better ones linked this to lower surface area and therefore fewer stomata. In part b) while most candidates could suggest that shallow, widespread roots would increase the uptake of water the better response described the larger area for absorption and how any water could be absorbed quickly before it seeps into the sandy soil. Almost all candidates could, in part c), give the advantage of having spines as protection from being eaten. It was worrying that so many believed that this would be by predators! Some of the best candidates described how spines would maintain a still layer of moist air reducing the diffusion gradient and therefore transpiration.

Question 10 was on selective breeding. In part a) most candidates were able to describe selective breeding although some confused this with genetic modification or micropropagation. Few candidates were able to give a sensible example of a desired characteristic from a crop plant. In part b) most candidates could give two ways natural selection differs from selective breeding.

Question 11 was on carbohydrates. All but a very few candidates could give the elements present in a carbohydrate molecule in part a). However, only the best candidates gained full credit in part b) for completing the table on the properties of starch and glucose. In part c) most candidates were able to describe a test they could carry out for glucose. A number of responses included adding glucose to the substance to be tested. Most responses also gave two safety precautions such as heating in a water bath and wearing safety glasses.

Question 12 part a) required candidates to complete a table on the characteristics of living organisms. Many candidates gained full marks for this item. Part b) required them to identify how a typical pant cell differs in structure from a typical animal cell and how a bacterium differs in structure from a virus. Most candidates could give two ways that a plant cell differs from an animal cell but they did less well on how a bacterium differs in structure from a virus.

Finally **Question 13** required candidates to describe an experiment you could do to find out the effect of pH on the growth of yeast. Some candidates clearly did not know what yeast is even though it is on the specification. Those from centres, who had practiced these types of questions, often using the CORMS prompt, were able to gain good scores. Candidates described a variety of ways of measuring growth of the yeast and many of these were given credit by the examiners.

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